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ABSTRACT

The purpose of this study was to determine if a correlation existed between the classes of books checked out of the San Antonio College Library and the classes of books used in the Library. Data for out-of-library and in-library use were collected during February, 1978, and arranged by Dewey Decimal Classification (DDC) tens. By using the Pearson product-moment correlation formula, the author found a significant positive correlation between out-of-library and in-library use of books. It was also concluded that over-the-counter circulation count is a reliable indicator of total library use within the DDC tens class spans. (Author)

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RESEARCH REPORT

Correlating the Classes of Books Taken Out Of and Books Used Within an Open-Stack Library

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April, 1978

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The purpose of this study was to determine if a correlation existed between the classes of books checked out of the San Antonio College Library and classes of books used in the Library. Data for out-of-library and in-library use were collected during February, 1978 and arranged by DDC tens. By using the Pearson product-moment correlation formula a significant coefficient was found and it was concluded that a correlation did exist between out-of-library and in-library use of books. It was also concluded that over-the-counter circulation count is a reliable indicator of total library use within the DDC tens class spans.

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INTRODUCTION

Probably from the very beginning of their existence librarians have kept count of the over-the-counter circulation transactions in their libraries. This practice has been fostered by the adoption of computerized circulation systems which can produce in minutes the same circulation statistics which once took library clerical assistants hours to compile. Despite their ease of collection, though, many librarians have long felt that circulation counts are not true indicators of library use. This skepticism is often generated by the fact that circulation counts do not include in-library use of books. The question of circulation counts indicating library use was recently considered at the San Antonio College Library.

The San Antonio College Library continually works to improve and develop its book collection, but during the 1977-1978 school year the library devoted special attention to its collection development program. An inventory and evaluation of the collection was conducted in an effort to identify areas where new and/or more books were needed. Over-the-counter circulation statistics obtained from the Library's computerized circulation system were used to identify levels of use received by the collection. The statistics were arranged by Dewey Decimal Classification (DDC) tens (e.g. 000's, 010's, 020's, etc.) with a count given for circulation transactions within each DDC ten. These statistics

did not include counts of in-library book use and the question arose: Is the over-the-counter circulation count a reliable indicator of total library use within the DDC tens?

Statement of the Problem

This study attempted to determine if there was a correlation between the classes of books checked out of the library and the classes of books used in the library. In this study a book was considered to be "used in the library" if it was removed from its position on the library shelves and not checked out for home use. Books a user reshelved were not counted. It was assumed that if a user reshelved a book, then the user demonstrated neither interest nor use in it. This assumption was also made by McGrath in his study of book use (1, p. 281).

Review of Related Literature

Book use and circulation analysis are popular concerns in the field of librarianship (2). A.K. Jain estimated that the total number of published and unpublished studies concerning the use of books, journals, and library facilities is well over 700 (3, p. 245). Some of these studies have been conducted to determine the ratio of books checked out of the library to books or materials used in the library.

Lyle, in a one-day study through use of a questionnaire at fifteen college and university libraries, found for every book checked out of the library, there were four library items used within the library. In this study, the items used within the

library included all library resources, such as books, records, documents, periodicals, and newspapers (4, p. 53).

Fussler and Simon found that in an open stack library there may be three to nine times as much browsing as recorded use of books, depending on the subject and regulations governing stack access (5, p. 115). Ford in his review of literature of user studies refers to research in Great Britain at Lancaster and Durham where similar ratios were obtained (6, p. 99).

Urquhart and Schofield determined the ratio of in-library use to borrowing at three libraries. The ratio at Library A was 1.64:1, Library B was 6.7:1, and Library C was 11.2:1 (7, p.237). Library C had a high ratio because it included in its count items other than books, as did Lyle.

In another study, Schofield, Cooper, and Waters found the ratio of internal to external use of books at a library to be 1:1.79 (8, p. 215). Bush, Galliher, and Morse found the ratio to be 4.1:1 at the M.I.T. Science Library (9, p. 102). Saracevic, Shaw, and Kantor conducted a study at Sears Library, Case Western Reserve University and found for every book borrowed, another was used in the library (10, p. 15).

Some studies have gone beyond the step of establishing ratios of in-library to out-of-library use and have used correlation to establish a relationship between these two types of book use. Pinzelik and Tolliver, in a study for the Purdue General Library, determined a high positive correlation between the statistics for home use of materials and library use of materials. It was

found, "... that library use statistics can be predicted based on data collected about home use statistics," (11, p.2)

McGrath, in studies conducted at the University of Southwestern Louisiana, found a correlation coefficient of .86 between books used within the library and books circulated. These books had been grouped according to class number spans for sixty-one academic departments. The second part of his study involved books grouped into 141 Library of Congress and Dewey Decimal classification categories. McGrath found a correlation coefficient of .84 for books used in the library and books circulated in the 141 class spans (1, pp. 282-284). He concluded: ... that circulation totals, when grouped into self-delineating spans, can be reliable indicators of the subjects used within, as well as out of the library (1, p. 285).

Galvin and Kent conducted a study at the University of Pittsburgh to determine the extent to which library materials are used and the full cost of such use. Part of their study involved examination of in-library use of books at Pittsburgh's Hillman Library. It was revealed that 74 percent of the titles used in-house had also circulated externally and they note that this is evidence to validate McGrath's study (12, p. 2318).

In a study at the Lippincott Library of the University of Pennsylvania, Bommer collected statistics for the circulation and in-library use rate for each of thirty-nine subject areas. He found a significant correlation coefficient of .924 between these statistics. Bommer concluded that there is approximately

one in-library use for each circulation use in the Lippincott Library (13, p. 187).

Statement of the Hypothesis

In view of the above studies which either determined ratios of in-library to out-of-library use of books, or showed a relationship between these two types of book use, it was hypothesized that there was a correlation between the classes of books checked out of the library and the classes of books used in the library. If the hypothesis was accepted, then it would be possible to predict in-library use of books, book use among the class spans, and most importantly, total book use. This information could then be used to plan and budget for collection development, stack and seating arrangements, and shelving assignments. If the hypothesis was rejected, then other indicators of in-library book use would need to be found.

METHOD

Subjects

This study took place at the San Antonio College Library during February, 1978. The total materials collection of the Library is approximately 221,000 volumes. The sample for the study were the books designated as general circulation books (approximately 111,000 volumes). Non-circulating books, periodicals, and government publications were not included in the study.

San Antonio College is a public, 2-year community college offering courses in 40 departments. The Spring 1978 enrollment was approximately 21,000 students.

Design

The Dewey Decimal Classification System (DDC) is used to classify books at the San Antonio College Library. The general circulation books were grouped by DDC tens and data on in-library and out-of-library book use were gathered for each of the 100 groups.

Procedure

Data for the first of the two variables to be correlated - books taken out of the library - were obtained from the monthly circulation analysis generated by the Library's computerized circulation system. These data were generated by DDC tens.

Data for the second variable - books used within the library - were specially collected. This was done by recording

the call numbers of books left on tables, desks, carrels, and other surfaces. The Library is an open-shelf library and users were instructed by signs not to reshelve books themselves. Thus, a potentially large body of data was available. As part of the daily shelving routine, student shelvers recorded the call number of books found on tables, desks, etc. before reshelving the books. These data were then tabulated by DDC tens. This method of measuring in-library use of books was considered by Morse to be fairly efficient (14, p. 84) and was used in earlier studies (1, 3, 11, 13).

RESULTS

Table 1 gives the total count and ratio for the two variables considered in this study - books checked out of the library arranged by DDC tens and books used in the library arranged by DDC tens. Appendix I gives the count and ratios for each of 100 DDC tens classification spans.

TABLE 1

Total Books Checked Out and Used In the Library

Total Out	Total In	Ratio	DDC Class Spans	Coefficient of Sample	Critical Coefficient*
5918	3375	1.8:1	100	.917	.197

*The coefficient of sample must be greater than this figure to be significant (.05 level of significance).

The ratios for the individual DDC tens and the ratio of 1.8:1 for the total count suggested a relationship between the two variables. The two variables were correlated using the Pearson product-moment correlation formula (See Appendix II). The coefficient of .917 proved to be significant at the .05 level of significance. Thus, the original hypothesis "that there was a correlation between the classes of books checked out of the library and classes of books used in the library" was supported. The coefficient of .917 was also significant at the .001 level of significance. The results of this study agree with the findings in several earlier studies (1, 11, 12, 13).

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this study it was concluded that a correlation existed between the classes of books checked out of the library and the classes of books used in the library. Over-the-counter circulation count is a reliable indicator of total library use within the DDC tens class spans. The high positive correlation means that if out-of-library circulation within a DDC ten class span is high, then in-library use of books within the same class span is high; or conversely, if out-of-library circulation within a DDC ten class span is low, then in-library use of books within the same class span is low.

A high circulation count within a DDC ten class span represents high demand and planning and budgeting for additional volumes in this class span should be emphasized. In areas of heavy use, consideration should also be given to stack and seating arrangement, stack and seating expansion, lighting, and shelving assignments.

Further study should be considered to determine how the San Antonio College Library's collection development program supports the College's curriculum by providing books for the class spans where high demand is most evident.

SUMMARY

The purpose of this study was to determine if a correlation existed between the classes of books checked out of the San Antonio College Library and classes of books used in the Library. Data for out-of-library and in-library use were collected during February, 1978 and arranged by DDC tens. By using the Pearson product-moment correlation formula a significant coefficient was found and it was concluded that a correlation did exist between out-of-library and in-library use of books. It was also concluded that over-the-counter circulation count is a reliable indicator of total library use within the DDC tens class spans.

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APPENDIX I

Books Checked Out and Used In the Library By DDC Ten Class Spans

Classes	Check Outs (X)	In Library Use (Y)	Ratio Out to In	X^2	Y^2	XY
000	77	40	1.9	5929	1600	3080
010	0	0		0	0	0
020	32	11	2.9	1024	121	352
030	4	12	0.3	16	144	48
040	0	0		0	0	0
050	0	1		0	1	0
060	1	0		1	0	0
070	15	18	0.8	225	324	270
080	11	5	2.2	121	25	55
090	4	2	2.0	16	4	8
Class Totals 000-099	144	89	1.6	7332	2219	3813
100	0	3		0	9	0
110	9	2	4.5	81	4	18
120	13	5	2.6	169	25	65
130	24	16	1.5	576	256	384
140	13	8	1.6	169	64	104
150	278	92	3.0	77284	8464	25576
160	1	2	0.5	1	4	2
170	34	32	1.1	1156	1024	1088
180	17	11	1.5	289	121	187
190	29	10	2.9	841	100	290
Class Totals 100-199	418	181	2.3	80566	10071	27714

APPENDIX I continued

Classes	Check Outs (X)	In Library Use (Y)	Ratio Out to In	X^2	Y^2	XY
200	10	5	2.0	100	25	50
210	5	1	5.0	25	1	5
220	18	4	4.5	324	16	72
230	8	10	0.8	64	100	80
240	7	4	1.8	49	16	28
250	0	1		0	1	0
260	3	6	0.5	9	36	18
270	3	1	3.0	9	1	3
280	14	9	1.6	196	81	126
290	40	34	1.2	1600	1156	1360
Class Totals 200-299	108	75	1.4	2376	1433	1742
300	275	178	1.5	75625	31684	48950
310	4	2	2.0	16	4	8
320	133	61	2.2	17689	3721	8113
330	180	39	4.6	32400	1521	7020
340	80	47	1.7	6400	2209	3760
350	39	21	1.9	1521	441	819
360	246	127	1.9	60516	16129	31242
370	115	65	1.8	13225	4225	7475
380	25	17	1.5	625	289	425
390	42	73	0.6	1764	5329	3066
Class Totals 300-399	1139	630	1.8	209781	65552	110878
400	9	11	0.8	81	121	99
410	10	1	10.0	100	1	10
420	24	12	2.0	576	144	288
430	0	1		0	1	0
440	6	4	1.5	36	16	24
450	1	0		1	0	0
460	14	5	2.8	196	25	70
470	0	0		0	0	0
480	1	0		1	0	0
490	2	4	0.5	4	16	8
Class Totals 400-499	67	38	1.8	995	324	499

APPENDIX I continued

Classes	Check Outs (X)	In Library Use (Y)	Ratio Out to In	X^2	Y^2	XY
500	6	3	2.0	36	9	18
510	50	71	0.7	2500	5041	3550
520	34	19	1.8	1156	361	646
530	12	12	1.0	144	144	144
540	35	36	1.0	1225	1296	1260
550	64	28	2.3	4096	784	1792
560	10	3	3.3	100	9	30
570	47	33	1.4	2209	1089	1551
580	6	18	0.3	36	324	108
590	22	18	1.2	484	324	396
Class Total 500-599	286	241	1.2	11986	9381	9495
600	6	0		36	0	0
610	486	185	2.6	236196	34225	89910
620	115	60	1.9	13225	3600	6900
630	40	10	4.0	1600	100	400
640	56	33	1.7	3136	1089	1848
650	283	97	2.9	80089	9409	27451
660	3	0		9	0	0
670	2	2	1.0	4	4	4
680	10	1	10.0	100	1	10
690	22	4	5.5	484	16	88
Class Total 600-699	1023	392	2.6	334879	48444	126611
700	77	34	2.3	5929	1156	2618
710	7	7	1.0	49	49	49
720	52	35	1.5	2704	1225	1820
730	11	10	1.1	121	100	110
740	65	64	1.0	4225	4096	4160
750	20	23	0.9	400	529	460
760	9	15	0.6	81	225	135
770	50	40	1.3	2500	1600	2000
780	62	78	0.8	3844	6084	4836
790	201	99	2.0	40401	9801	19899
Class Total 700-799	554	405	1.4	60254	24865	36087

APPENDIX I continued

Classes	Check Outs (X)	In Library Use (Y)	Ratio Out to In	X^2	Y^2	XY
800	126	120	1:1	15876	14400	15120
810	526	317	1:7	276676	100489	166742
820	367	245	1:5	134689	60025	89915
830	30	16	1:9	900	256	480
840	59	52	1:1	3481	2704	3068
850	0	2		0	4	0
860	37	30	1:2	1369	900	1110
870	5	2	2:5	25	4	10
880	50	21	2:4	2500	441	1050
890	45	15	3:0	2025	225	675
Class Total 800-899	1245	820	1:5	437541	179148	278170
900	7	17	0:4	49	289	119
910	80	80	1:0	6400	6400	6400
920	458	147	3:1	209764	21609	67326
930	16	12	1:3	256	144	192
940	80	104	0:8	6400	10816	8320
950	12	20	0:6	144	400	240
960	5	0		25	0	0
970	331	120	2:8	109561	14400	39720
980	5	3	1:7	25	9	15
990	0	1		0	1	0
Class Total 900-999	994	504	2:0	332624	54068	122332
	ΣX	ΣY		ΣX^2	ΣY^2	ΣXY
	5978	3375		1478334	395805	717341

APPENDIX II

Calculation of Correlation Coefficient Using Pearson r Formula

$N = 100$

$\Sigma X = 5978$

$\Sigma Y = 3375$

$\Sigma X^2 = 1478334$

$\Sigma Y^2 = 395805$

$\Sigma XY = 717341$

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{N}}{\sqrt{\left[\Sigma X^2 - \frac{(\Sigma X)^2}{N}\right]\left[\Sigma Y^2 - \frac{(\Sigma Y)^2}{N}\right]}}$$

$$r = \frac{717341 - \frac{(5978)(3375)}{100}}{\sqrt{\left[1478334 - \frac{(5978)^2}{100}\right]\left[395805 - \frac{(3375)^2}{100}\right]}}$$

$$r = \frac{717341 - 201757.5}{\sqrt{\left[1478334 - 357364.84\right]\left[395805 - 113906.25\right]}}$$

$$r = \frac{515583.5}{\sqrt{\left[1120969.2\right]\left[281898.75\right]}}$$

$$r = \frac{515583.5}{\sqrt{315999816268.5}}$$

$$r = \frac{515583.5}{562138.61}$$

$df = N - 2$

$df = 100 - 2$

$df = 98$

$r = 0.917$